

ABSTRACT

An integrated optic gyroscope is disclosed which is based on a photonic integrated circuit (PIC) having a bidirectional laser source, a pair of optical waveguide phase modulators and a pair of waveguide photodetectors. The PIC can be connected to a passive ring resonator formed either as a coil of optical fiber or as a coiled optical waveguide. The lasing output from each end of the bidirectional laser source is phase modulated and directed around the passive ring resonator in two counterpropagating directions, with a portion of the lasing output then being detected to determine a rotation rate for the integrated optical gyroscope. The coiled optical waveguide can be formed on a silicon, glass or quartz substrate with a silicon nitride core and a silica cladding, while the PIC includes a plurality of III-V compound semiconductor layers including one or more quantum well layers which are disordered in the phase modulators and to form passive optical waveguides.